

# BEST MANAGEMENT PRACTICES MANUAL



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## **CHAPTER 3      TEMPORARY NON-STORMWATER MANAGEMENT**

### **3.1      Introduction**

Non-stormwater management best management practices (BMPs) are source control BMPs that prevent pollution by limiting or reducing potential pollutants at their source before they come in contact with stormwater. These practices involve day-to-day operations of the construction site and are usually under the control of the Contractor. These BMPs are also referred to as “good housekeeping practices,” which involve keeping a clean, orderly construction site.

### **3.2      Temporary Non-Stormwater Management Goals**

Temporary non-stormwater management goals consist of:

#### **1.    Perimeter Controls**

- a.    Ensure that no non-stormwater, or only a minimal amount, enters or leaves the project area.
- b.    Treat or filter non-stormwater discharge waters, as many times as possible needed to meet standards, before leaving the project area.

#### **2.    Controls within the Project**

- a.    Divert non-stormwater away from the project, especially disturbed areas.
- b.    Protect all bodies of water (ponds, streams, wetlands, etc.).

#### **3.    Final Product**

- a.    Coordinate all temporary non-stormwater controls to facilitate permanent measures.

### 3.3 Best Management Practices (BMPs)

Temporary non-stormwater management involves the use of the following BMPs:

	Typical Highway Construction Activities																						
	Demolish Pavement/Structures	Clear and Grub	Construct Access Road	Grading (inc. cut and fill slopes)	Channel Excavation	Channel Paving	Trenching/Underground Drainage	Underground Drainage Facility Installation	Drainage Inlet Modification	Utility Trenching	Utility Installation	Subgrade Preparation	Base Paving	AC Paving	Concrete Paving	Saw Cutting	Joint Sealing	Grind/Groove	Structure Excavation	Erect Falsework	Bridge/Structure Construction	Remove Falsework	Striping
Temporary Sediment Control Management																							
Best Management Practices																							
NS-1 Water Conservation Practices	X	X	X	X	X	X	X	X	X	X		X				X	X	X	X		X		
NS-2 Dewatering Operations	X			X	X	X	X	X	X	X	X	X							X		X		
NS-3 Paving and Grinding Operations			X			X			X				X	X	X	X	X	X			X		
NS-4 Temporary Stream Crossing			X				X	X		X	X								X	X	X		
NS-5 Clear Water Diversion	X		X		X	X													X	X	X		
NS-6 Illicit Connection/Illegal Discharge Detection and Reporting	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NS-7 Potable Water/Irrigation								X		X	X												X
NS-8 Vehicle and Equipment Cleaning	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NS-9 Vehicle and	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

	Typical Highway Construction Activities																				
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Temporary Sediment Control Management																					
Best Management Practices																					
Equipment Fueling																					
NS-10 Vehicle and Equipment Maintenance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
NS-11 Pile Driving Operations																		X	X	X	
NS-12 Concrete Curing															X				X	X	
NS-13 Material and Equipment Use Over Water	X		X									X	X	X	X	X	X	X	X	X	
NS-14 Concrete Finishing			X			X		X							X				X	X	
NS-15 Structure Demolition/Removal Over or Adjacent to Water	X		X									X	X	X	X	X	X	X	X	X	
NS-16 Freeze Reduction			X		X					X	X										

## NS-1 WATER CONSERVATION PRACTICES

ITD Standards and Specifications for Highway Construction, Section 106 and 205.

Photograph to come.

### BMP Objectives

- ☒ Perimeter Control
- ☐ Slope Protection
- ☐ Borrow and Stockpiles
- ☒ Drainage Areas
- ☐ Sediment Trapping
- ☐ Stream Protection
- ☐ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and/or the transport of pollutants off site.

### Appropriate Applications

- Water conservation practices are implemented on all construction sites and wherever water is used.
- Water conservation practices apply to all construction projects.
- Washing of equipment may be required to reduce the spreading of invasive weeds and other species. Check Special Provisions for requirements.

### Limitations

None identified.

### Design Parameters

- Keep water equipment in good working condition and repair water leaks promptly.
- Stabilize water truck filling area.
- Minimize or avoid washing of vehicles and equipment on the construction site, if possible.
- Avoid using water to clean construction areas. Do not use water to clean pavement. Paved areas shall be swept and/or vacuumed.
- Report unexpected discharges to the Engineer immediately.

### Maintenance and Inspection

Conduct inspections as required by the NPDES permit or contract specifications.

## NS-2 DEWATERING OPERATIONS



### BMP Objectives

- |                                     |                       |
|-------------------------------------|-----------------------|
| <input checked="" type="checkbox"/> | Perimeter Control     |
| <input type="checkbox"/>            | Slope Protection      |
| <input type="checkbox"/>            | Borrow and Stockpiles |
| <input checked="" type="checkbox"/> | Drainage Areas        |
| <input checked="" type="checkbox"/> | Sediment Trapping     |
| <input type="checkbox"/>            | Stream Protection     |
| <input type="checkbox"/>            | Temporary Stabilizing |
| <input type="checkbox"/>            | Permanent Stabilizing |

### Definition and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and stormwater (accumulated precipitation) must be removed from a work location so that construction work may be accomplished.

### Appropriate Applications

These practices are implemented for discharges of non-stormwater and stormwater from construction sites. Non-stormwater includes, but is not limited to, groundwater, water from cofferdams, dewatering of piles, water diversions, and waters used during construction activities that must be removed from a work area.

Practices identified in this section are also appropriate for implementation when managing the removal of stormwater from depressed areas at a construction site. Stormwater mixed with non-stormwater should be managed as non-stormwater.

### Limitations

- Dewatering operations for non-stormwater will require, and must comply with, applicable local permits, project-specific permits, and regulations.
- Site conditions will dictate design and use of dewatering operations.
- A dewatering plan shall be submitted as part of the SWPPP, detailing the location of dewatering activities and equipment, as well as discharge point.
- The controls discussed in this BMP address sediment only. If the presence of polluted water with hazardous substances is identified in the contract, the Contractor shall implement dewatering pollution controls as required by the contract documents. If the quality of water to be removed by dewatering is not identified as polluted in the contract documents, but is later

determined by observation or testing to be polluted, the Contractor shall notify the Engineer and the Stormwater Quality Coordinator.

- When possible, avoid dewatering discharges by using the water for dust control or by infiltrating it, if appropriate.

### **Design Parameters**

- Dewatering for stormwater shall follow this BMP and use treatment measures specified herein.
- IDEQ can authorize, with whatever conditions deemed necessary, short-term activities even though such activities can result in a violation of IDAPA 58.01.02 Water Quality Standards. Short-term activities are associated with the regeneration, growing, and harvesting of trees and timber.
  - No activity can be authorized unless:
    - The activity is essential to the protection or promotion of public interest.
    - No permanent or long-term injury of beneficial uses is likely as a result of the activity.
  - Activities eligible for authorization include, but are not limited to:
    - Wastewater treatment facility maintenance
    - Fish eradication projects
    - Mosquito abatement projects
    - Algae and weed control projects
    - Dredge and fill activities
    - Maintenance of existing structures
    - Limited road and trail reconstruction
    - Soil stabilization measures
    - Habitat enhancement structures, and
    - Activities which result in overall enhancement or maintenance of beneficial uses.
- The discharge of stormwater to a water body or storm drain is subject to the requirements of the Construction General Permit. Sediment control and other appropriate BMPs must be employed when this water is discharged.
- Discharges must comply with regional and watershed-specific discharge requirements.
- Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges must not cause erosion at the discharge point.
- Dewatering records shall be maintained for a period of 3 years.

### **Sediment Treatment**

A variety of methods can be used to treat water during dewatering operations from the construction site. This section presents several devices that provide options to achieve sediment removal. The size of particles present in the sediment and Construction General Permit or receiving water limitations on sediment are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate.

Tank size will depend on flow volume, constituents of concern, and residency period required. A qualified Engineer is required to properly size and design dewatering equipment.

### **Maintenance and Inspection**

- Conduct inspections as required by the NPDES permit or contract specifications.
- Repair or replace to ensure the BMPs function as designed.
- Accumulated sediment removed during the maintenance of a dewatering device may be either spread on-site and stabilized or disposed of at a disposal site as approved by the Engineer.
- Accumulated sediment that is commingled with other pollutants must be disposed of in accordance with all applicable laws and regulations and as approved by the Engineer.

### **Category 1: Constructed Settling Technologies**

The devices discussed in this category are to be used exclusively for dewatering operations.

#### **Sediment/Desilting Basin (SC-9)**

##### ***Description***

A sediment basin is a temporary basin with a controlled release structure that is formed by excavation and/or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging.

##### ***Appropriate Applications***

- Effective for the removal of trash, gravel, sand, and silt and some metals that settle out with the sediment.

##### ***Implementation***

- Excavation and construction of related facilities is required.
- Temporary sediment basins must be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

##### ***Maintenance***

- Maintenance is required for safety fencing, vegetation, embankment, and inlet and outfall structures, as well as other features.
- Removal of sediment is required when the design capacity is reduced by 50 percent.

#### **Sediment Trap (SC-10)**

##### ***Description***



A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging.

### ***Appropriate Applications***

- Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

### ***Implementation***

- Excavation and construction of related facilities is required.
- Trap inlets shall be located to maximize the travel distance to the trap outlet.
- Rock or vegetation shall be used to protect the trap outlets against erosion.

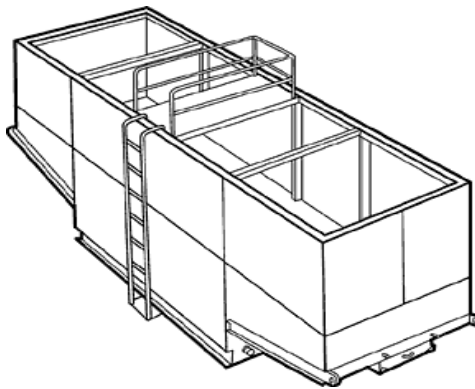
### ***Maintenance***

- Maintenance is required for vegetation, embankment, and inlet and outfall structures, as well as other features.
- Removal of sediment is required when the design capacity is reduced by 50 percent.

## **Category 2: Mobile Settling Technologies**

The devices discussed in this category are typical of tanks that can be used for sediment treatment of dewatering operations. A variety of vendors supply these tanks.

### **Weir Tank**



### ***Description***

A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

### ***Appropriate Applications***

The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

### ***Implementation***

- Tanks are delivered to the site by the vendor, who can provide assistance with setup and operation.

- Tank size will depend on flow volume, constituents of concern, and residency period required. An Engineer is required to properly size and design weir tanks.

***Maintenance***

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal must be by licensed waste disposal company.

***Dewatering Tank******Description***

A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

***Appropriate Applications***

The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

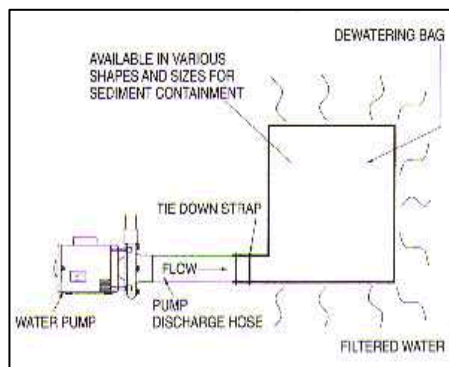
***Implementation***

- Tanks are delivered to the site by the vendor, who can provide assistance with setup and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. An Engineer is required to appropriately size tank.

***Maintenance***

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal must be by licensed waste disposal company.

***Category 3: Basic Filtration Technologies******Gravity Bag Filter***



### ***Description***

A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects sand, silt, and fines.

### ***Appropriate Applications***

- Effective for the removal of sediments (gravel, sand, and silt). Some metals are removed with the sediment.

### ***Implementation***

- Water is pumped into one side of the bag and seeps through the bottom and sides of the bag.
- A secondary barrier, such as a rock filter bed barrier, is placed beneath and beyond the edges of the bag to capture sediments that escape the bag.

### ***Maintenance***

- Replacement of the bag is required when it no longer filters sediment or passes water at a reasonable rate.

## **Category 4: Advanced Filtration Technologies**

### **Sand Media Particulate Filter**



### ***Description***

Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed.

### ***Appropriate Applications***

- Effective for the removal of trash, gravel, sand, silt, and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Can be used for standalone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Can also be used to provide additional treatment to water treated via settling or basic filtration.

***Implementation***

- The filters require delivery to the site and initial setup. The vendor can provide assistance with installation and operation.

***Maintenance***

- The filters require monthly service to monitor and maintain the level of the sand media.

***Pressurized Bag Filter******Description***

A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header, allowing for the discharge of flow in series to an additional treatment unit. Vendors provide pressurized bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

***Appropriate Applications***

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil-absorbent bags are available for hydrocarbon removal.
- Can be used to provide secondary treatment to water treated via settling or basic filtration.

***Implementation***

- The filters require delivery to the site and initial setup. The vendor can provide assistance with installation and operation.

***Maintenance***

- The filter bags require replacement when the pressure differential exceeds the manufacturer's recommendation.

### **Cartridge Filter**



#### ***Description***

Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with pressurized bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

#### ***Appropriate Applications***

Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges. Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

#### ***Implementation***

- The filters require delivery to the site and initial setup. The vendor can provide assistance.

#### ***Maintenance***

- The cartridges require replacement when the pressure differential exceeds the manufacturer's recommendation.

## NS-3 PAVING AND GRINDING OPERATIONS

ITD Standards and Specifications for Highway Construction, Section 203.



### BMP Objectives

- ☐ Perimeter Control
- ☐ Slope Protection
- ☐ Borrow and Stockpiles
- ☐ Drainage Areas
- ☒ Sediment Trapping
- ☐ Stream Protection
- ☐ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Paving, saw cutting, and grinding operations often involve the use of materials containing potentially harmful chemicals and can generate fine particles that should not be allowed to enter receiving waters. The procedures within this fact sheet are designed to minimize the transport of pollutants associated with these activities to the storm drain system or receiving water body.

### Appropriate Applications

These procedures are implemented where paving, surfacing, resurfacing, grinding, or saw cutting, may pollute runoff or discharge to the storm drain system or watercourses.

### Limitations

- Finer solids are not effectively removed by filtration systems.
- Paving opportunities may be limited during wet weather.

### Design Parameters

- Release agents used to coat asphalt transport trucks and asphalt spreading equipment shall be non-foaming and non-toxic.
- Place plastic materials under asphaltic concrete (AC) paving equipment while not in use, to catch and/or contain drips and leaks. See also WM-5 (Spill Prevention and Control).
- When paving involves AC, implement the following steps to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or other paving materials:

- Sand and gravel from new asphalt must be prevented from getting into storm drains, streets, and creeks.
- Old or spilled asphalt must be recycled or disposed of as approved.
- AC grindings, pieces, or chunks used in embankments or shoulder material must not be allowed to enter any storm drains or watercourses. Install a silt fence or inlet protection until structure is stabilized or permanent controls are in place.
- All broken asphalt must be collected, removed, and, when practical, recycled; otherwise, disposed of as approved.
- During chip seal application and sweeping operations, petroleum, petroleum-covered aggregate, or fine particulates, must not be allowed to enter any storm drain or watercourses. Apply temporary perimeter controls, such as inlet protection, until all chip seal materials are completely cured and sweeping of excess is complete.
- Use care during application of seal coat, tack coat, slurry seal, and/or fog seal near drainage inlet structures and manholes. To avoid introduction of these materials into the storm drain system or sewer, apply these materials by hand sprayer or brush when working adjacent to inlets, or cover drainage inlet structures and manholes with plastic.
- Seal coat, tack coat, slurry seal, or fog seal shall not be applied if rain is predicted to occur during the application or curing period.
- Paving equipment parked on-site shall be parked over plastic to prevent a *de minimis* release to soil.
- Clean asphalt-coated equipment off-site whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5 (Solid Waste Management). Any cleaning on-site shall follow NS-8 (Vehicle and Equipment Cleaning).
- Do not wash sweepings or grindings from exposed aggregate concrete into a storm drain system. Collect and return to aggregate base stockpile or dispose of as approved.
- If aggregate is washed on-site, allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit, as described in WM-9 (Concrete Waste Management), or dispose of as approved.
- Do not allow saw-cut Portland Concrete Cement (PCC) slurry to enter storm drains or watercourses.

### **Pavement Grinding or Removal**

- Residue from grinding operations collected and contained, shall not be allowed to flow across the pavement, and shall not be left on the surface of the pavement. See also WM-9 (Concrete Waste Management) and WM-11 (Liquid Waste Management).
- Collect pavement dig-out material by mechanical or manual methods. This material may be recycled or, if allowed in the contract documents, used as shoulder material or base material at locations approved by the Engineer.
- If dig-out material cannot be recycled, dispose of as approved.

- Dig-out activities shall not be conducted in the rain.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses, and store consistent with WM-4 (Stockpile Management).
- Dispose or use AC grindings as approved by the Engineer. See also WM-9 (Concrete Waste Management).

#### **Raised/Recessed Pavement Marker Application and Removal**

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Load melting tanks with care and do not fill to beyond 6 inches from the top to leave room for splashing.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.
- Dispose of waste as approved.

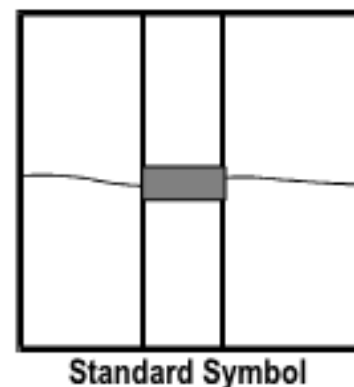
#### **Maintenance and Inspection**

- Conduct inspections as required by the NPDES permit or contract specifications.
- Ensure that employees and subcontractors are implementing appropriate measures during paving operations.



## NS-4 TEMPORARY STREAM CROSSING

Refer to: ITD Standard Specifications, Section 602.



### Definition and Purpose

A temporary stream crossing (a bridge or culvert) provides a means for construction vehicles to cross streams or watercourses without damaging the streambed or channel and protects the stream bank from further degradation and sediment loss.

### Appropriate Applications

Temporary stream crossings are installed at sites:

- When it is necessary to cross a stream and a permanent crossing is not feasible or not yet constructed.
- When heavy equipment must be moved from one side of a stream channel to another.
- Where light-duty construction vehicles have to cross the stream channel frequently for a short period.
- When crossing perennial streams or watercourses causes significant erosion.
- Where construction activities will not last longer than 1 year.

The specific loads and the stream conditions will dictate which of the following types of stream crossing to employ.

- **Bridge:** Bridges are appropriate for streams with high flow velocities, steep gradients, and/or where temporary restrictions in the channel are not allowed. Where conditions are adequate, bridges are the preferred method to cross a stream. A bridge provides the least disturbance or obstruction to flows and fish migration. Old flatbed rail cars in some instances can be used effectively to bridge a stream.

#### BMP Objectives

- |                                     |                       |
|-------------------------------------|-----------------------|
| <input type="checkbox"/>            | Perimeter Control     |
| <input type="checkbox"/>            | Slope Protection      |
| <input type="checkbox"/>            | Borrow and Stockpiles |
| <input type="checkbox"/>            | Drainage Areas        |
| <input type="checkbox"/>            | Sediment Trapping     |
| <input checked="" type="checkbox"/> | Stream Protection     |
| <input type="checkbox"/>            | Temporary Stabilizing |
| <input type="checkbox"/>            | Permanent Stabilizing |

- **Culvert:** A culvert may be used on perennial intermittent streams, where conditions are not adequate for bridges.
- **Fords:** Fords are appropriate during the dry season in arid areas. Used on dry washes and ephemeral streams, as well as low-flow perennial streams. Cellular Confinement System (CCS), a type of ford crossing, is also appropriate for use in streams.

### Limitations

- Temporary stream crossings are a direct source of pollution and every effort should be made to use an alternate method, such as a detour.
- A bridge is expensive to design and install and may be difficult to justify for a temporary crossing. Culverts cause greater disturbance during installation and removal. In sensitive stream systems, the disturbance impact may be prohibitive. When it is necessary to cross a stream, a well-planned approach will minimize damage to the stream bank and reduce erosion.
- The use of stream crossing measures below the high water mark of a stream or other water body (waters of the U.S.) should be carefully evaluated due to Section 404 permit requirements. A U.S. Corps of Engineers Section 404 permitting would be required. A 401 Water Quality Certification and an Idaho Department of Water Resources Stream Alteration Permit may be required. Both are issued by the Department of Water Resources.
- If numerical-based water quality standards (WQS) are mentioned in associated permits or certifications, testing and sampling may be required. If monitoring related to these numerical-based WQS is not addressed in the contract documents, contact the Engineer.
- Installation may require dewatering or temporary diversion of the stream. See NS-2 (Dewatering Operations) and NS-5 (Clear Water Diversion).
- Stream crossings may become a constriction in the waterway, which can obstruct flood flow and cause flow backups or washouts. If improperly designed, flow backups can increase the pollutant load through washouts and scouring.
- Fording a stream by placing gravel or rock in the bottom of the streambed is **unacceptable**, except for less sensitive or intermittent streams where this procedure would be the least disruptive to streambed and stream bank.
- Use of natural or other gravel in the stream for construction of CCS ford crossing will be contingent upon approval by fisheries agencies.
- CCS should not be used in exclusively high or fast flows.
- Upon completion of construction activities, CCS blocks must be removed from stream.

### General Considerations

Stream crossing designs must be adapted for each application. Location of temporary stream crossing shall address:

- Site selection where erosion potential is low.

- Areas where the side slopes from highway runoff will not split into the side slopes of the crossing.

Design and installation will comply with the following guidelines:

- Knowledge of stream flows and soil strength is required.
- Designs shall be prepared under direction of, and approval by, a registered civil and/or structural engineer.
- The stability in the crossing and adjacent areas to withstand the design flow will be provided.
- Surface treatments such as oil or other potentially hazardous waste materials will be avoided.

### **Construction Considerations**

- Construction roadways, adjacent work area, and stream bottoms shall be stabilized against erosion.
- Construction will occur during dry periods to minimize stream disturbance and reduce costs.
- Construction will occur at or near the natural elevation of the stream bed to prevent potential flooding upstream of the crossing.
- Temporary sediment control BMPs will be installed in accordance with sediment control BMPs presented in Chapter 3 to minimize erosion of embankment into flow lines.
- Vehicles and equipment shall not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of a water body where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed, except as authorized by an Engineer, as necessary to complete the work.
- Temporary water body crossings and encroachments shall be constructed to minimize scour. Cobbles used for temporary water body crossings or encroachments shall be clean, rounded river cobble.
- The exterior of vehicles and equipment that will encroach on the water body within the project shall be maintained free of grease, oil, fuel, and residues.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Precautions shall be taken to avoid damage to vegetation by people or equipment. Disturbed vegetation shall be replaced with the appropriate soil stabilization measures.
- Riparian vegetation, when removed pursuant to the provisions of the work, shall be cut off no lower than ground level to promote rapid re-growth.
- Access roads and work areas built over riparian vegetation shall be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble shall be removed upon completion of project activities.
- Any temporary artificial obstruction placed within flowing water shall only be built from material, such as clean gravel, that will cause little or no siltation.

- Drip pans shall be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- Conceptual temporary stream crossings are shown in figures at the end of this section.
- Project plans should contain specific construction requirements. Make field adjustments as necessary to ensure proper performance.

### **Specific Considerations**

- Culverts are relatively easy to construct and able to support heavy equipment loads.
- Fords have the maximum load limits; therefore, they are the least expensive of the crossing structures.
- Temporary fords are not appropriate if construction will continue through the rainy season, if thunderstorms are likely, or if the stream is perennial.
- CCS crossing structures consist of clean, washed gravel and CCS blocks. CCS are appropriate for streams that would benefit from an influx of gravel; for example, salmonid streams, streams or rivers below reservoirs, as well as urban, channelized streams. Many urban stream systems are gravel-deprived due to human influences, such as dams, gravel mines, and concrete channels.
- CCS allow designers to use either angular or naturally-occurring, rounded gravel, because the cells provide the necessary structure and stability. In fact, natural gravel is optimal for this technique, because of the habitat improvement it will provide after removal of the CCS.
- A gravel depth of 2 to 12 inches for a CCS structure is sufficient to support most construction equipment.
- An advantage of a CCS crossing structure is that relatively little rock or gravel is needed, because the CCS provides the stability.
- Bridges are generally more expensive to design and construct, but provides the least disturbance of the stream bed and constriction of the waterway flows.

### **Maintenance and Inspection**

- Inspections shall be conducted as required by the NPDES permit or contract specifications.
- Maintenance provisions shall include:
  - Periodic removal of debris behind fords, in culverts, and under bridges.
  - Replacement of lost protective aggregate from inlets and outlets of culverts.
  - Removal of temporary crossing promptly when it is no longer needed.
- Corrections will be made based on the NPDES Permit inspections. If erosion or undermining of the structure occurs, take corrective action immediately.
- Upon removal of the stream crossing, the stream bank and streambed will be stabilized and the site will be returned to as near-natural condition as possible. Some form of rock riprap and permanent revegetation may be required if the stream bank has been disturbed.

## NS-5 CLEAR WATER DIVERSION



### BMP Objectives

- ☒ Perimeter Control
- ☒ Slope Protection
- ☐ Borrow and Stockpiles
- ☒ Drainage Areas
- ☐ Sediment Trapping
- ☐ Stream Protection
- ☐ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Clear water diversions consists of various structures and measures that intercept clear runoff upstream of a project site, transport it around the work area, and discharge it downstream with minimal water quality degradation by either the project construction operations or the construction of the diversion. Clear water diversions are used in a waterway to enclose a construction area and reduce sediment pollution from construction work occurring in or adjacent to water. Isolation techniques are methods that isolate near-shore work from a water body. Structures commonly used as part of this system include diversion ditches, berms, dikes, slope drains, rock, gravel bags, wood, aqua barriers, cofferdams, filter fabric or turbidity curtains, drainage and interceptor swales, pipes, or flumes.

### Appropriate Applications

- A clear water diversion is typically implemented where appropriate permits have been secured and work must be performed in a live stream or water body.
- Clear water diversions are appropriate for isolating construction activities occurring within or near a water body such as stream bank stabilization or culvert, bridge, pier, or abutment installation. They may also be used in combination with other methods, such as clear water bypasses and/or pumps.
- Pumped diversions are suitable for intermittent and low-flow streams. Excavation of a temporary bypass channel or passing the flow through a flume is appropriate for the diversion of streams less than 20 feet wide, with flow rates less than 99 cubic feet per second.
- Clear water diversions incorporating clean washed gravel may be appropriate for use in salmon spawning streams.

## Limitations

- Diversion/encroachment activities will usually disturb the waterway during installation and removal of diversion structures.
- Specific permit requirements or mitigation measures may be included in contract documents because of clear water diversion/encroachment activities.
- Diversion/encroachment activities may constrict the waterway, which can obstruct flows and cause flooding or washouts.
- Diversion structures should not be installed without identifying potential impacts to the stream channel.
- Diversion or isolation activities are inappropriate in deep water unless designed or reviewed by a hydraulic engineer.
- Diversion or isolation activities should not completely dam stream flow.
- Dewatering and removal may require additional sediment control or water treatment (see NS-2 [Dewatering Operations]).

## General Considerations

- Where working areas encroach on live streams, barriers adequate to prevent the flow of muddy water into streams shall be constructed and maintained between working areas and streams. During construction of the barriers, muddying of streams shall be held to a minimum.
- Where possible, diversion/encroachment impacts shall be avoided or minimized by scheduling construction during periods of low-flow or when the stream is dry (see also the project special provisions for scheduling requirements). Scheduling shall also consider seasonal releases of water from dams, fish migration and spawning seasons, and water demands due to crop irrigation.
- Diversion structures must be adequately designed to accommodate fluctuations in water depth or flow volume due to storms, flash floods, etc.
- Heavy equipment driven in wet portions of a water body to accomplish work shall be completely clean of dirt and petroleum residue, and water levels shall be below the gearboxes of the equipment in use, or lubricants and fuels are sealed such that inundation by water shall not result in leaks.
- Excavation equipment buckets may reach out into the water for the purpose of removing or placing fill materials. Only the bucket of the crane/excavator/backhoe may operate in a water body. The main body of the crane/excavator/backhoe shall not enter the water body, except as necessary to cross the stream to access the work site.
- Stationary equipment such as motors and pumps, located within or adjacent to a water body, shall be positioned over drip pans.
- When any artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall, at all times, be allowed to pass downstream to maintain aquatic life downstream.

- The exterior of vehicles and equipment that will encroach on a water body within the project shall be maintained free of grease, oil, fuel, and residues.
- Equipment shall not be parked below the high water mark overnight unless allowed by a permit.
- Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Precautions shall be taken to avoid damage to vegetation by people or equipment. Disturbed vegetation shall be replaced with the appropriate soil stabilization measures.
- Riparian vegetation, when removed pursuant to the provisions of the work, shall be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation shall be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble shall be removed upon completion of project activities.
- Drip pans shall be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour.
- Diversion structures shall be constructed with materials free of potential pollutants such as soil, silt, sand, clay, grease, or oil.

#### **Temporary Diversions/Encroachments**

- In high flow velocity areas, stabilize slopes of embankments and diversion ditches using an appropriate liner, in accordance with EC-11 (Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats) or use rock slope protection.
- Where appropriate, use natural streambed materials such as large cobbles and boulders for temporary embankment/slope protection or other temporary soil stabilization methods.
- Provide for velocity dissipation at transitions in the diversion, such as the point where the stream is diverted to the channel and the point where the diverted stream is returned to its natural channel. See also SC-6 (Inlet/Outlet Protection).

#### **Temporary Dry Construction Areas**

- When dewatering behind temporary structures to create a temporary dry construction area, such as coffer dams, pass pumped water through a sediment settling device, such as a portable tank or settling basin, before returning water to the water body; see also NS-2 (Dewatering Operations).
- If the presence of polluted water or sediment is identified in the contract, the Contractor shall implement dewatering pollution controls as required by the contract documents. If the quality of water or sediment to be removed while dewatering is not identified as polluted in the contract documents, but is later determined by observation or testing to be polluted, the Contractor shall notify the Engineer and comply with IDEQ requirements.
- Any substance used to assemble or maintain diversion structures, shall be non-toxic and non-hazardous.

- Any material used to minimize seepage underneath diversion structures, such as grout, shall be EPA-approved, non-toxic, non-hazardous, and as close to a neutral pH as possible.

### **Isolation Techniques**

Isolation techniques are methods that isolate near-shore work from a water body. Techniques include sheet pile enclosures, water-filled geotextile (Aqua Dam), gravel berm with impermeable membrane, gravel bags, cofferdams, and K-rail.

### ***Filter Fabric Isolation Technique***

#### **Definition and Purpose**

A filter fabric isolation structure is a temporary structure built into a waterway to enclose a construction area and reduce sediment pollution from construction work in or adjacent to water. This structure is composed of filter fabric, gravel bags, and steel t-posts.

#### **Appropriate Applications**

- Filter fabric may be used for construction activities such as stream bank stabilization, or culvert, bridge, pier, or abutment installation. It may also be used in combination with other methods, such as clean water bypasses and/or pumps.
- This method involves placement of gravel bags or continuous berms to “key-in” the fabric and subsequently stake the fabric in place.
- If spawning gravel is used, all other components of the isolation can be removed from the stream, and the gravel can be spread out and left as salmonid spawning habitat. Whether spawning gravel or other types of gravel are used, only clean washed gravel should be used as infill for the gravel bags or continuous berm.
- This is a method that should be used in relatively calm water and can be used in smaller streams.

#### **Limitations**

- Do not use if the installation, maintenance, and removal of the structures will disturb sensitive aquatic species of concern.
- Not appropriate for projects where dewatering is necessary.
- Not appropriate to completely dam stream flow.

#### **Standards and Specifications**

- For the filter fabric isolation method, a non-woven or heavy-duty fabric is recommended over standard silt fence. Using rolled geotextiles allows non-standard widths to be used.
- Filter fabric shall be anchored with gravel bags filled with clean, washed gravel. Sand shall not be used. If a bag should split open, the gravel can be left in the stream, where it can provide aquatic habitat benefits.
- Another anchor alternative is a continuous berm, made with the Continuous Berm Machine. This is a gravel-filled bag that can be made in very long segments. The length of the berm is usually limited to 20 feet for ease of handling.



### Installation

- Place the fabric on the bottom of the stream, and place either a bag of clean, washed gravel or a continuous berm over the bottom of the fabric, such that a bag-width of fabric lies on the stream bottom. The bag should be placed on what will be the outside of the isolation area.
- Pull the fabric up, and place a metal t-post immediately behind the fabric, on the inside of the isolation area. Attach the fabric to the post with three diagonal nylon ties.
- Continue placing fabric as described above until the entire work area has been isolated, staking the fabric at least every 6 feet.

### Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Immediately repair any gaps, holes, or scour.
- Remove sediment buildup.
- Remove BMP upon completion of construction activity. Recycle or reuse if applicable.
- Revegetate areas disturbed by BMP removal if needed.

### **Turbidity Curtain Isolation Technique**

#### Definition and Purpose

A turbidity curtain is a relatively impervious fabric barrier used to isolate the near-shore work area. The barriers are intended to confine the suspended sediment. The curtain is a floating barrier and thus does not prevent water from entering the isolated area; rather, it prevents suspended sediment from getting out. This method is very good in isolating fine as well as coarse sediment.

#### Appropriate Applications

Turbidity curtains should be used where sediment discharge to a stream is unavoidable. They are used when construction activities adjoin quiescent waters, such as lakes, ponds, lagoons, bays, and slow flowing rivers. The curtains are designed to deflect and contain sediment within a limited area and provide sufficient retention time so that the soil particles will fall out of suspension.

#### Limitations

- Turbidity curtains should not be used in flowing water; they are best suited for use in ponds, lakes, and very slow-moving rivers.
- Turbidity curtains should not be placed across the width of a channel.
- Removing sediment that has been deflected and settled out by the curtain may create a discharge problem through the re-suspension of particles and by accidental dumping by the removal equipment. Caution must be taken in removal.

#### Standards and Specifications

- Turbidity curtains should be oriented parallel to the direction of flow.
- The curtain should extend the entire depth of the watercourse in calm-water situations.
- In wave conditions, the curtain should extend to within 1 foot of the bottom of the watercourse, such that the curtain does not stir up sediment by hitting the bottom repeatedly.

If it is desirable for the curtain to reach the bottom in an active-water situation, a pervious filter fabric may be used for the bottom 1 foot.

- The top of the curtain should consist of flexible flotation buoys, and the bottom shall be held down by a load line incorporated into the curtain fabric. The fabric shall be a brightly-colored impervious mesh.
- The curtain shall be held in place by anchors placed at least every 100 feet.
- The anchors shall first be placed, and then the fabric shall be towed out in a furled condition and connected to the anchors. The anchors should be connected to the flotation devices, not to the bottom of the curtain. Once in place, the furling lines shall be cut, and the bottom of the curtain shall be allowed to sink.
- Sediment that has been deflected and settled out by the curtain should be removed; however, consideration must be given to the probable outcome of the removal procedure. It must be asked if it will create more of a sediment problem through re-suspension of the particles or by accidental dumping of material during removal. It is recommended that the soil particles trapped by the turbidity curtain be removed only if there has been a significant change in the original contours of the affected area in the watercourse.
- Particles should always be allowed to settle for a minimum of 6 to 12 hours prior to their removal or prior to removal of the turbidity curtain.

#### Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Allow sediment to settle for 6 to 12 hours prior to removal of sediment or curtain. After removing sediment, wait an additional 6 to 12 hours before removing the curtain.
- To remove, install furling lines along the curtain, detach from anchors, and tow out of the water.

#### **K-rail River Isolation**

##### Definition and Purpose

This is temporary sediment control, or stream isolation method that uses K-rails to form the sediment deposition area, or to isolate the in-stream or near-bank construction area.

Barriers are placed end-to-end in a pre-designed configuration, and gravel-filled bags are used at the toe of the barrier and also at their abutting ends to seal and prevent movement of sediment beneath or through the barrier walls.

##### Appropriate Applications

The K-rail isolation can be used in streams with higher water velocities than many other isolation techniques.

##### Limitations

The K-rail method does not allow for full dewatering.

##### Standards and Specifications

- To create a floor for the K-rail, move large rocks and obstructions. Place washed gravel and gravel-filled bags to create a level surface for K-rail to sit.

- Place the bottom two K-rails adjacent to each other and parallel to the direction of flow. Fill the center portion with gravel bags, and then place the third K-rail on top of the bottom two. There should be sufficient gravel bags between the bottom K-rails such that the top one is supported by the gravel.
- Place plastic sheeting around the K-rails, and secure at the bottom with gravel bags.
- Further support can be added by pinning and cabling the K-rails together.
- Use large riprap and boulders to support either side of the K-rail, especially where there is strong current.

#### Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Any damage, movement, or other problems should be addressed immediately.
- Sediment should be allowed to settle for at least 6 to 12 hours prior to removal of sediment, and for 6 to 12 hours prior to removal of the barrier.

#### *Stream Diversions*

##### Definition and Purpose

Stream diversions consists of a system of structures and measures that intercept an existing stream upstream of the project, transports it around the work area, and discharges it downstream. The selection of which stream diversion technique to use depends upon the type of work involved, physical characteristics of the site, and the volume of water flowing through the project.

##### Appropriate Applications

- Pumped diversions are appropriate in areas where dewatering is necessary.
- Dam-type diversion may serve as temporary access to the site.
- Stream diversions are appropriate at work areas that require isolations from flows.

##### Limitations

- Pump diversions have limited flow capacity.
- Pumped diversions require frequent monitoring of pumps.
- Large flows during storm events can overtop dams.
- Flow diversion and re-direction with small dams involves in-stream disturbance and mobilization of sediment.

##### Standards and Specifications:

- Installation guidelines will vary based on existing site conditions and type of diversion used.
- Diversions shall be sized to convey design flood flows.
- Pump capacity must be sufficient for design flow; the upper limit is approximately 10 cubic feet per second, which is the capacity of two 8-inch pumps.
- Adequate energy dissipation must be provided at the outlet to minimize erosion.

- Materials used to create dams upstream and downstream of the diversion should be erosion-resistant. Materials such as steel plates, sheet piles, sandbags, continuous berms, inflatable water bladders, etc., would be acceptable.
- Construction of a diversion channel shall begin with excavation of the channel at the proposed downstream end, with work proceeding upstream. Once the watercourse to be diverted is reached, and the excavated channel is stable, the upstream end shall be breached, and water shall be allowed to flow down the new channel. Once flow has been established in the diversion channel, the diversion weir shall be installed in the main channel; this will force all water to be diverted from the main channel.

#### Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Monitor pumps, which may be required frequently for pumped diversions.
- Remove debris and repair linings and slope protection as required. Repair holes, gaps, or scour.
- Upon completion of work, remove the diversion or isolation structure and redirect flow through the new culvert or back into the original stream channel. Recycle or re-use if applicable.
- Revegetate areas disturbed by BMP removal, if needed.

## NS-6 ILLICIT CONNECTION/ ILLEGAL DISCHARGE DETECTION AND REPORTING



### BMP Objectives

- ☐ Perimeter Control
- ☐ Slope Protection
- ☐ Borrow and Stockpiles
- ☐ Drainage Areas
- ☐ Sediment Trapping
- ☒ Stream Protection
- ☐ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents to the Engineer.

### Appropriate Applications

- Illicit connection/illegal discharge detection and reporting is applicable anytime an illicit connection or discharge is discovered or illegally-dumped material is found on the construction site.
- This BMP applies to all construction projects.

### Limitations

- Unlabeled or non-identifiable material shall be assumed to be hazardous.
- Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the Contractor.
- Procedures and practices presented in this BMP are general. The Contractor shall use extreme caution and immediately notify the Engineer when illicit connections or illegal dumping or discharges are discovered.
- If pre-existing hazardous materials or wastes are known to exist on-site, the Contractor's responsibility will be detailed in separate special provisions.

### Identification of Illicit Connections and Illegal Dumping or Discharges

- Solids—Look for debris or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- Liquids—Signs of illegal liquid dumping or discharge can include:

- Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils.
- Pungent odors coming from the drainage systems.
- Discoloration or oily substances in the water or stains and residues detained within ditches, channels, or drain boxes.
- Abnormal water flow during the dry weather season.
- Urban Areas—Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season.
  - Unusual flows in subdrain systems used for dewatering.
  - Pungent odors coming from the drainage systems.
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels, or drain boxes.
  - Excessive sediment deposits, particularly adjacent to or near active off-site construction projects.
- Rural Areas—Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season.
  - Non-standard junction structures.
  - Broken concrete or other disturbances at or near junction structures.

### **Reporting**

Notify the Engineer of any illicit connections and illegal dumping or discharge incidents at the time of discovery. The Engineer will notify ITD who will in turn notify the appropriate agency or agencies.

### **Cleanup and Removal**

The Contractor is not responsible for investigation and cleanup of illicit or illegal dumping or discharges not generated by the Contractor. ITD may direct the Contractor to cleanup non-hazardous dumped or discharged material on the construction site.

### **Maintenance and Inspection**

Conduct inspections as required by the NPDES permit or contract specifications.

## NS-7 POTABLE WATER/ IRRIGATION



### BMP Objectives

- ☐ Perimeter Control
- ☒ Slope Protection
- ☒ Borrow and Stockpiles
- ☐ Drainage Areas
- ☐ Sediment Trapping
- ☐ Streams
- ☒ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Potable water/irrigation management consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

### Appropriate Applications

Implement this BMP whenever the above activities or discharges occur at or enter a construction site.

### Limitations

None identified.

### Standards and Specifications

- Minimize irrigation downtime. Shut water off before cutting pipe. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.
- Where possible, direct water from off-site sources around or through a construction site in a way that minimizes contact with the construction site.
- When possible, reuse discharges from water line flushing for landscaping purposes.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.

### **Maintenance and Inspection**

- Conduct inspections as required by the NPDES permit or contract specifications.
- Repair broken water lines as soon as possible or as directed by the Engineer.



## NS-8 VEHICLE AND EQUIPMENT CLEANING

Refer to: ITD Standard Drawings P-3-E



### BMP Objectives

- |                                     |                       |
|-------------------------------------|-----------------------|
| <input checked="" type="checkbox"/> | Perimeter Control     |
| <input type="checkbox"/>            | Slope Protection      |
| <input type="checkbox"/>            | Borrow and Stockpiles |
| <input type="checkbox"/>            | Drainage Areas        |
| <input checked="" type="checkbox"/> | Sediment Trapping     |
| <input type="checkbox"/>            | Stream Protection     |
| <input type="checkbox"/>            | Temporary Stabilizing |
| <input type="checkbox"/>            | Permanent Stabilizing |

### Definition and Purpose

Vehicle and equipment cleaning procedures and practices are used to minimize or eliminate the discharge of pollutants from vehicle and equipment cleaning operations to storm drain system or to watercourses.

### Appropriate Applications

These procedures are applied on all construction sites where vehicle and equipment cleaning is performed.

### Limitations

None.

### Design Parameters

- On-site vehicle and equipment washing is discouraged.
- Cleaning of vehicles and equipment with detergents, solvents, or steam shall not occur on the project site unless the Engineer has been notified in advance and the resulting wastes are fully contained and disposed of outside the highway right-of-way. Resulting wastes and by-products shall not be discharged or buried within the highway right-of-way and must be captured and recycled or disposed according to the requirements of WM-11 (Liquid Waste Management) or WM-7 (Hazardous Waste Management), depending on the waste characteristics. Minimize use of solvents. The use of diesel for vehicle and equipment cleaning is prohibited.
- Vehicle and equipment wash water shall be contained for percolation or evaporative drying away from storm drain inlets or watercourses and shall not be discharged within the highway right-of-way. Sediment control BMPs shall be applied if applicable.

- All vehicles/equipment that regularly enter and leave the construction site must be cleaned off-site.
- When vehicle/equipment washing/cleaning must occur on-site, and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area shall have the following characteristics, and shall be arranged with the Engineer.
  - Located away from storm drain inlets, drainage facilities, or watercourses.
  - Paved with concrete or asphalt and bermed with an impermeable material to contain wash waters and to prevent run-on and runoff.
  - Configured with a sump to allow collection and disposal of wash water.
  - Used only when necessary.
- When cleaning vehicles/equipment with water:
  - Use as little water as possible. High-pressure sprayers may use less water than a hose, and shall be considered.
  - Use positive shutoff valve to minimize water usage.
- Wash waters shall not be discharged to storm drains or watercourses.
- Facility wash racks shall discharge to a sanitary sewer, recycle system or other approved discharge system and shall not discharge to the storm drainage system or watercourses.

### **Maintenance and Inspection**

- Conduct inspections as required by the NPDES permit or contract specifications.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Remove liquids and sediment from the sump as needed to ensure intended use and function is maintained.

## NS-9 VEHICLE AND EQUIPMENT FUELING

Refer to: ITD Standard Drawings P-5-E



### BMP Objectives

- ☐ Perimeter Control
- ☐ Slope Protection
- ☐ Borrow and Stockpiles
- ☐ Drainage Areas
- ☐ Sediment Trapping
- ☒ Stream Protection
- ☐ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Vehicle and equipment fueling procedures and practices are designed to prevent the discharge of fuel spills and leaks into storm drain systems or to watercourses.

### Appropriate Applications

These procedures are applied on all construction sites where vehicle and equipment fueling takes place.

### Limitations

On-site vehicle and equipment fueling shall only be used where it's impractical to send vehicles and equipment off-site for fueling.

### Design Parameters

- When fueling must occur on-site, the Contractor shall select and designate an area to be used.
- Absorbent spill clean-up materials and spill kits shall be available in fueling areas and on fueling trucks and shall be disposed of properly after use.
- Drip pans or absorbent pads shall be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable containment area in a dedicated fueling area.
- Dedicated fueling areas shall be protected from stormwater run-on and runoff, and shall be located at least 150 feet from downstream drainage facilities and watercourses. Where possible, fueling should be performed on level-grade areas.
- Nozzles used in vehicle and equipment fueling shall be equipped with an automatic shut-off to control drips. Fueling operations shall not be left unattended.
- Protect fueling areas with impermeable berms and/or dikes to prevent stormwater run-on, runoff, and to contain spills.

- Use of vapor recovery nozzles helps control drips as well as air pollution where required by air quality permits and regulations. The nozzle shall be secured upright when not in use.
- Fuel tanks shall not be “topped off.”
- Vehicle and equipment leaks shall be repaired immediately on problem vehicles, or equipment shall be removed from the project site.
- Absorbent spill clean-up materials shall be available and appropriately identified in fueling and maintenance areas and used on small spills instead of hosing down or burying techniques. The spent absorbent material shall be removed promptly and disposed of properly.
- Federal, state, and local requirements shall be observed for any fueling facility and stationary aboveground storage tanks. Refer to WM-2 (Material Delivery and Storage).
- Mobile fueling of construction equipment throughout the site shall be minimized. Whenever practical, equipment shall be transported to the designated fueling area.

**Maintenance and Inspection**

- Inspections shall be conducted as required by the NPDES permit or contract specifications.
- An ample supply of spill cleanup material shall be kept on-site.
- Spills shall be immediately cleaned up and contaminated soil and cleanup materials shall be properly disposed of.
- Spills greater than or equal to reportable quantities shall be reported to the District’s Hazardous Material Coordinator and any other required agencies.

## NS-10 VEHICLE AND EQUIPMENT MAINTENANCE



### BMP Objectives

- ☐ Perimeter Control
- ☐ Slope Protection
- ☐ Borrow and Stockpiles
- ☐ Drainage Areas
- ☐ Sediment Trapping
- ☒ Stream Protection
- ☐ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Vehicle and equipment maintenance consists of procedures and practices to prevent the discharge of pollutants to the storm drain systems or to watercourses from vehicle and equipment maintenance procedures.

### Appropriate Applications

These procedures are applied on all construction projects where an on-site yard area is necessary for storage and maintenance of heavy equipment and vehicles.

### Design Parameters

- Drip pans or absorbent pads shall be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a contained, dedicated maintenance area.
- Dedicated maintenance areas shall be protected from stormwater run-on and runoff, and shall be located at least 15 meters (50 feet) from downstream drainage facilities and watercourses.
- Drip pans or plastic sheeting shall be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- Absorbent spill clean-up materials shall be available and clearly identified in maintenance areas and shall be disposed of properly after use. Substances used to coat asphalt transport trucks and asphalt-spreading equipment shall be non-toxic.
- Off-site maintenance facilities shall be used whenever practical.
- For long-term projects, constructing roofs or using portable tents over maintenance areas shall be considered.
- Tires, batteries, petroleum products and spill cleanup materials shall be properly disposed of or recycled.
- Fluid leaks shall be repaired immediately.

- Impermeable spill containment dikes or secondary containment shall be provided around stored oil and chemical drums.

**Maintenance and Inspection**

- Inspections shall be conducted as required by the NPDES permit or contract specifications.
- Leaks shall be repaired immediately, or the vehicle, equipment, or container shall be removed from the project site or replaced.
- Damaged hoses and leaky gaskets shall be repaired or replaced as needed.

## NS-11 PILE DRIVING OPERATIONS



### BMP Objectives

- |                                     |                       |
|-------------------------------------|-----------------------|
| <input type="checkbox"/>            | Perimeter Control     |
| <input type="checkbox"/>            | Slope Protection      |
| <input type="checkbox"/>            | Borrow and Stockpiles |
| <input type="checkbox"/>            | Drainage Areas        |
| <input type="checkbox"/>            | Sediment Trapping     |
| <input checked="" type="checkbox"/> | Stream Protection     |
| <input type="checkbox"/>            | Temporary Stabilizing |
| <input type="checkbox"/>            | Permanent Stabilizing |

### Definition and Purpose

The construction and retrofit of bridges and retaining walls sometimes includes driving piles for foundation support and shoring operations. Driven piles are typically constructed of concrete, steel, or timber. Driven sheet piles are used for shoring and cofferdam construction. Proper control and use of equipment, materials, and waste products from pile driving operations will reduce the discharge of potential pollutants to the storm drain system or watercourses.

### Appropriate Applications

These procedures apply to construction sites near or adjacent to a watercourse or groundwater where permanent and temporary pile driving operations (impact and vibratory) take place, including operations using pile shells for construction of cast-in-steel-shell and cast-in-drilled-hole drilled shaft piles.

### Limitations

Drilled shafts often use drilling fluid.

### Design Parameters

- Use drip pans or absorbent pads during vehicle and equipment maintenance, cleaning, fueling, and storage. Refer to NS-9 (Vehicle and Equipment Fueling) and NS-10 (Vehicle and Equipment Maintenance).
- Have spill kits and cleanup materials available at all locations of pile driving. Refer to WM-5 (Spill Prevention and Control).
- Keep equipment that is stored or in use in streambeds; or on docks, or other structures over water bodies, leak free.

- Park equipment over plastic sheeting or equivalent where possible. Plastic sheeting is not a substitute for drip pans or absorbent pads. The storage or use of equipment in streambeds or other bodies of water shall comply with all applicable permits.
- Implement other BMPs as applicable, such as NS-2 (Dewatering Operations), WM-6 (Solid Waste Management), and WM-11 (Liquid Waste Management).
- When not in use, store pile driving equipment away from concentrated flows of runoff, drainage courses, and inlets. Protect hammers and other hydraulic attachments from run-on by placing them on plywood and covering them with plastic or a comparable material prior to the onset of rain.

**Maintenance and Inspection**

Conduct inspections as required by the NPDES permit or contract specifications.



## NS-12 CONCRETE CURING



### BMP Objectives

- ☒ Perimeter Control
- ☐ Slope Protection
- ☐ Borrow and Stockpiles
- ☐ Drainage Areas
- ☐ Sediment Trapping
- ☒ Stream Protection
- ☐ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Concrete and pavement curing is used in the construction of structures such as bridges, retaining walls, and pump houses. Concrete curing includes the use of both chemical and water methods. Proper procedures minimize pollution of runoff during concrete curing.

### Appropriate Applications

All concrete elements of a structure (i.e., footings, columns, abutments, stems, soffit, and deck) and concrete pavements are subject to curing requirements.

### Limitations

None identified.

### Chemical Curing

- Avoid over-spray of curing compounds.
- Minimize the drift of chemical cure as much as possible by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-2 (Material Delivery and Storage).
- Protect drain inlets prior to the application of curing compounds. Refer to SC-6 (Inlet/Outlet Protection).
- Refer to WM-5 (Spill Prevention and Control).

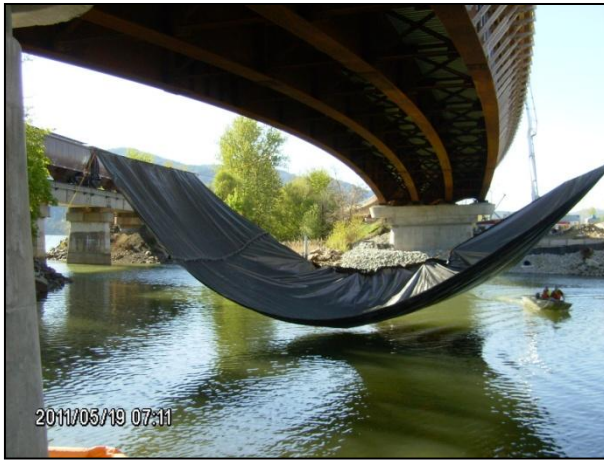
**Water Curing for Bridge Decks, Retaining Walls, and other Structures**

- Direct cure water away from inlets and watercourses to collection areas for disposal in accordance with all applicable permits.
- When practical, collect cure water and transport or dispose of water in a non-erodible manner.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

**Maintenance and Inspection**

- Conduct inspections as required by the NPDES permit or contract specifications.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Replace lining and remove debris as necessary.

## NS-13 MATERIAL AND EQUIPMENT USE OVER WATER



### BMP Objectives

- ☐ Perimeter Control
- ☐ Slope Protection
- ☐ Borrow and Stockpiles
- ☒ Drainage Areas
- ☐ Sediment Trapping
- ☒ Stream Protection
- ☐ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Material and equipment use over water consists of procedures for the proper use, storage, and disposal of materials and equipment on barges, boats, temporary construction pads, or similar locations that minimize or eliminate the discharge of potential pollutants to a watercourse.

### Appropriate Applications

These procedures shall be implemented for construction materials and wastes (solid and liquid) and any other materials that may be detrimental if released. This BMP applies to sites where materials and equipment are used on barges, boats, docks, and other platforms over or adjacent to a watercourse.

### Design Parameters

- Refer to WM-2 (Material Delivery and Storage) and WM-5 (Spill Prevention and Control).
- Use drip pans and absorbent materials for equipment and vehicles and ensure that an adequate supply of spill cleanup materials is available.
- Place drip pans under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is expected to be idle for more than 1 hour.
- Maintain equipment in accordance with NS-10 (Vehicle and Equipment Maintenance). If a leaking line cannot be repaired, remove equipment from over the water.
- Provide watertight curbs or toe boards to contain spills and prevent materials, tools, and debris from leaving the barge, platform, dock, etc.
- Secure all materials to prevent discharges to receiving waters via wind.
- Identify types of spill control measures to be employed, including the storage of such materials and equipment. Ensure that staff is trained regarding the deployment and access of control measures and that those measures are being used.
- Ensure the timely and proper removal of accumulated wastes.
- Refer to WM-6 (Solid Waste Management) and WM-7 (Hazardous Waste Management).

- Comply with all necessary permits required for construction within or near the watercourse.
- Refer to NS-15 (Structure Demolition/Removal Over or Adjacent to Water).

**Maintenance and Inspection**

- Conduct inspections as required by the NPDES permit or contract specifications.
- Ensure that employees and subcontractors implement appropriate measures for storage and use of materials and equipment.

## NS-14 CONCRETE FINISHING



### BMP Objectives

- ☐ Perimeter Control
- ☐ Slope Protection
- ☐ Borrow and Stockpiles
- ☐ Drainage Areas
- ☒ Sediment Trapping
- ☒ Stream Protection
- ☐ Temporary Stabilizing
- ☐ Permanent Stabilizing

### Definition and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Proper procedures minimize the impact that concrete-finishing methods may have on runoff.

### Appropriate Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

### Limitations

Specific permit requirements may be included in the contract documents for certain concrete finishing operations.

### Design Parameters

- Follow containment requirements stated in the project special provisions, if any.
- Collect and properly dispose of water and solid waste from high-pressure water blasting operations.
- Collect water from blasting operations and transport or dispose of water in a non-erodible manner.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering) in accordance with applicable permits.
- Protect inlets during sandblasting operations. Refer to SC-6 (Inlet/Outlet Protection).
- Refer to WM-9 (Concrete Waste Management).
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.

- When blast residue contains potentially hazardous waste, refer to WM-7 (Hazardous Waste Management).

**Maintenance and Inspection**

- Conduct inspections as required by the NPDES permit or contract specifications.
- At the end of each work shift, remove and contain the liquid and solid wastes from containment structures, if any, and from the general work area.

## NS-15 STRUCTURE DEMOLITION/ REMOVAL OVER OR ADJACENT TO WATER



### BMP Objectives

- |                                     |                       |
|-------------------------------------|-----------------------|
| <input checked="" type="checkbox"/> | Perimeter Control     |
| <input type="checkbox"/>            | Slope Protection      |
| <input type="checkbox"/>            | Borrow and Stockpiles |
| <input type="checkbox"/>            | Drainage Areas        |
| <input checked="" type="checkbox"/> | Sediment Trapping     |
| <input checked="" type="checkbox"/> | Stream Protection     |
| <input type="checkbox"/>            | Temporary Stabilizing |
| <input type="checkbox"/>            | Permanent Stabilizing |

### Definition and Purpose

Procedures to protect water bodies from debris and wastes associated with structure demolition or removal over or adjacent to watercourses.

### Appropriate Applications

Full bridge demolition and removal, partial bridge removal (e.g., barrier rail, edge of deck) associated with bridge widening projects, concrete channel removal, or any other structure removal that could potentially affect water quality.

### Limitations

Specific permit requirements may be included in the contract documents.

### Design Parameters

- Do not allow demolished material to enter waterway.
- Refer to NS-5 (Clear Water Diversion) to direct water away from work areas.
- Use attachments on construction equipment such as backhoes to catch debris from small demolition operations.
- Use covers or platforms to collect debris.
- Stockpile accumulated debris and waste generated during demolition away from watercourses and in accordance with WM-4 (Stockpile Management).
- Ensure safe passage for wildlife.
- Report discharges to waterways to the Engineer immediately upon discovery.
- For structures containing hazardous materials, (e.g., lead paint or asbestos) refer to WM-7 (Hazardous Waste Management). For demolition work involving soil excavation around lead-painted structures, refer to WM-8 (Contaminated Soil Management).

### Maintenance and Inspection

- Inspections shall be conducted as required by the NPDES permit or contract specifications.

- Any debris-catching devices shall be emptied regularly. Collected debris shall be removed and stored away from the watercourse and protected from run-on and runoff.



## NS-16 FREEZE REDUCTION



### BMP Objectives

- |                                     |                       |
|-------------------------------------|-----------------------|
| <input checked="" type="checkbox"/> | Perimeter Control     |
| <input type="checkbox"/>            | Slope Protection      |
| <input type="checkbox"/>            | Borrow and Stockpiles |
| <input checked="" type="checkbox"/> | Drainage Areas        |
| <input type="checkbox"/>            | Sediment Trapping     |
| <input type="checkbox"/>            | Stream Protection     |
| <input type="checkbox"/>            | Temporary Stabilizing |
| <input type="checkbox"/>            | Permanent Stabilizing |

### Definition and Purpose

Snow and ice accumulations in structures such as ditches and culverts can lead to plugging and subsequently to significant water flows across disturbed areas causing erosion. Frozen culverts can cause water to flow over roadways, destabilizing them. Ice blockage in channels can increase water levels in the channels causing flooding and potentially resulting in significant damage. This BMP involves the use of oversized culverts, dual culverts, elevated culvert outlets, and heat trace to reduce the impacts of freezing weather on culvert effectiveness.

### Appropriate Applications

Generally, ice blockage occurs during the winter months and proper slopes and proper installation of standard hydraulic structures reduce freezing. However, in areas where failure could cause significant damage, conservation methods such as the ones described in this BMP may be necessary.

This BMP is appropriate in areas where heavy frost and snow may cause unacceptable failure, such as at or near environmentally hazardous sites, or in locations where failures could be a health hazard or cause unacceptable problems.

### Limitations

- This BMP is not applicable in areas with limited access and space to install oversized and/or dual hydraulic structures.
- Elevated culvert outlets in streams should be avoided if fish migration is a concern.
- Heat trace may not be appropriate for remote areas with limited access to electricity.

### Design Parameters

- Install oversized culverts to allow for some freezing.
- Install dual culverts with one culvert raised higher in elevation than the other culvert. This will allow water passage through the upper culvert if the lower culvert freezes.

- Install the culvert such that there is a vertical drop of approximately 2 feet at the outlet, which may reduce water freezing within the culvert.
- Install channel freeze protective measures.

**Maintenance and Inspection**

- Conduct inspections as required by the NPDES permit or contract specifications.
- Disconnect and remove any electrical components when no longer required for freeze reduction.